

FOUR NEW SPECIES OF CAREX (CYPERACEAE) FROM MEXICO, WITH NOTES ON THE MEXICAN CAREX FLORA

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INTRODUCTION

The decade and a half since the publication of Hermann's (1974) treatment of *Carex* in Mexico and Central America has seen the accumulation of a number of new species and new records of Mexican species of *Carex*. Some of these have been previously published and others are here reported for the first time. This paper attempts to bring the Mexican *Carex* flora up to date with a tabular summary of published additions (table 1), description of four new species, and listing of more new records. If the new records are of species not in Hermann (1974), a brief summary of distinguishing features or a reference to a key is provided. Comments on several poorly known species or erroneous reports are also included.

NEW SPECIES

Carex mackenziana Weath., known from only a single 1934 collection from Nuevo León, was long considered a morphologically and geographically isolated species. A poor 1952 collection from Tamaulipas of a nearly sterile specimen similar to *C. mackenziana*, but differing in a number of significant features complicated the situation (Reznicek 1986). An immature 1968 specimen belonging to the same species and from the same area in Tamaulipas unfortunately did little to help resolve the problem. The range of the *C. mackenziana* complex was extended to Chiapas by an excellent 1981 collection of a clearcut new species. In 1989, I was able to visit the Tamaulipas locality to study in the field and obtain better collections of that poorly known plant. Mature, fertile material that could be compared accurately with both *C. mackenziana* and the Chiapas plant showed that all three were distinct species, though similar morphologically and presumably closely related. The Chiapas and Tamaulipas collections are described and discussed below, and a key is here provided to separate these three species. This key fits directly under the first lead of couplet 2 in the key in Reznicek (1986), as these are the only pubescent-fruited members of *Carex* sect. *Hymenochlanae* (Drejer) L. Bailey known from the Neotropics.

1. Lower leaf sheaths hispidulous with red prickly-hairs, uppermost 3–5 lateral spikes closely aggregated, peduncle of terminal spike 1.8–4.8 (–7) mm long, anthers 1.3–2.5 mm long.
C. caeligena.
1. Lower leaf sheaths glabrous, uppermost 3–5 lateral spikes not closely aggregated, peduncle of terminal spike 4–17 mm long, anthers 2.3–3.8 mm long.
 2. Pistillate and staminate scales pubescent abaxially, the margins ciliate; perigynium beaks with a hyaline, flared, ciliate apex. *C. pubigluma.*
 2. Pistillate and staminate scales glabrous abaxially or scabrous on the midvein, the margins not ciliate; perigynium beaks more or less bidentulate at apex. *C. mackenziana.*

Carex caeligena Reznicek, sp. nov. (fig. 1).—TYPE: MEXICO. Tamaulipas: Mpio. Gómez Farías, vicinity of Rancho del Cielo Biological Station ca. 7 km WNW of Gómez Farías, summit of ridge where trail to Indian Springs (Ojo de Agua de los Indios) connects with old logging road paralleling the pipe to the spring, 1400 m, 1 Jun 1989, *Reznicek & Naczi 8439* (holotype: MICH!; isotypes: BM! CHAPA! CAS! DUKE! F! GENT! MEXU! MO! NY! TEX! WIS!).

Plantae cespitosae; culmi 40–110 cm alti; vaginae basales purpurascens, scabrae. Folia 7–12, plerumque basalia; laminae 19–65 cm longae, 2.8–7.8 mm latae; vaginae 2.9–14.3 cm longae, hispidulae; ligulae (5–) 5.5–14 mm longae. Inflorescentiae 10–45 cm longae; spicae 5–8; spica terminalis plus minusve erecta; spicae laterales androgynae, pendulae; bracteae infimae laminis 2.5–25 cm longis, 1.6–4.7 mm latis et vaginis 1.4–8.6 mm longis. Perigynia 2.9–4.3 mm longa, 1.2–1.8 mm lata, ascendens, in rostrum contracta; rostra 0.4–0.7 mm longa. Achenium 1.9–2.6 mm longum, 1.2–1.6 mm latum. Styli marcescentes; stigmata 3. Antherae 3, 1.3–2.5 mm longae.

Plants caespitose, with short, thick rhizomes; roots greyish brown to dark brown, not densely felted with root hairs; fertile culms 40–110 cm tall, trigonous, smooth, with scabrous, purple bladeless sheaths with stramineous veins. Leaves 7–12, mostly basal; blades 19–65 cm long, 2.8–7.8 mm wide, plicate, more or less hispidulous on adaxial surface just above ligule, otherwise glabrous, the margins antrorsely scabrous, the widest leaves 4.7–7.8 mm wide; leaf sheaths 2.9–14.3 cm long, more or less tightly enveloping culms, hispidulous with red prickly-hairs, especially on lower sheaths, strongly purple-tinged near base; inner band of sheaths glabrous, stramineous to purple-tinged, the apex concave to “V” shaped; ligules (5–) 5.5–14 mm long, acute, usually reduced or vestigial on upper leaves, the free portion ciliate. Vegetative shoots 26–64 cm tall; leaves 5–9, similar to those of fertile culms; pseudoculms 2.9–8.6 cm tall. Inflorescences 10–45 cm long, with the upper 3–5 spikes strongly crowded and overlapping and the lowest 2 spikes 4.2–27.5 cm distant; spikes single at nodes, with all but the upper pendulous on filiform, flexuous, smooth peduncles; lowermost spikes with peduncles 2–15.2 cm long, the uppermost lateral spikes with peduncles 0.3–0.9 cm long; lowermost bracts with blades 2.5–24.6 cm long and 1.6–4.7 mm wide and sheaths 1.4–8.6 cm long, the uppermost bracts much reduced. Spikes 5–8, the terminal staminate or sometimes staminate proximally and distally and pistillate in the middle, rarely androgynous, the lateral androgynous or sometimes pistillate (very rarely the uppermost lateral spike wholly staminate). Terminal spikes 1.8–5.7 cm long, 0.9–2.4 mm wide, ca. 60–120-flowered if staminate, otherwise the staminate portion (0–) 0.3–1.8 cm long and 3–25-flowered proximally and 0.6–2.3 cm long and 30–90-flowered distally; pistillate middle portion 0.2–2.8 cm long, 3.9–6.5 mm wide, 1–50-flowered; peduncles 1.8–4.8 (–7) mm long. Lateral spikes 1.1–6.9 cm long; staminate portion (0–) 0.3–1.9 (–5.5) cm long, 5–50-flowered; pistillate portion 0.4–4.2 (–6.9) cm long, 3–55-flowered. Pistillate scales 2.6–4.5 mm long, 1.4–2.2 mm wide, oblong to obovate, acute to acuminate, sometimes with a scabrous awn up to 0.8 mm long, glabrous or scabrous on midvein, green with broad, hyaline margins, purple-tinged at base, 3-veined. Staminate scales 3.2–5.3 mm long, 1.3–1.9 mm wide, ovate to obovate, obtuse to acuminate, occasionally with a scabrous awn up to 1.1 mm long, glabrous, green with broad, hyaline margins, 3-veined. Perigynia 2.9–4.3 mm long, 1.3–1.8 mm wide, ascending, trigonous with more or less flat, obovate sides, green,

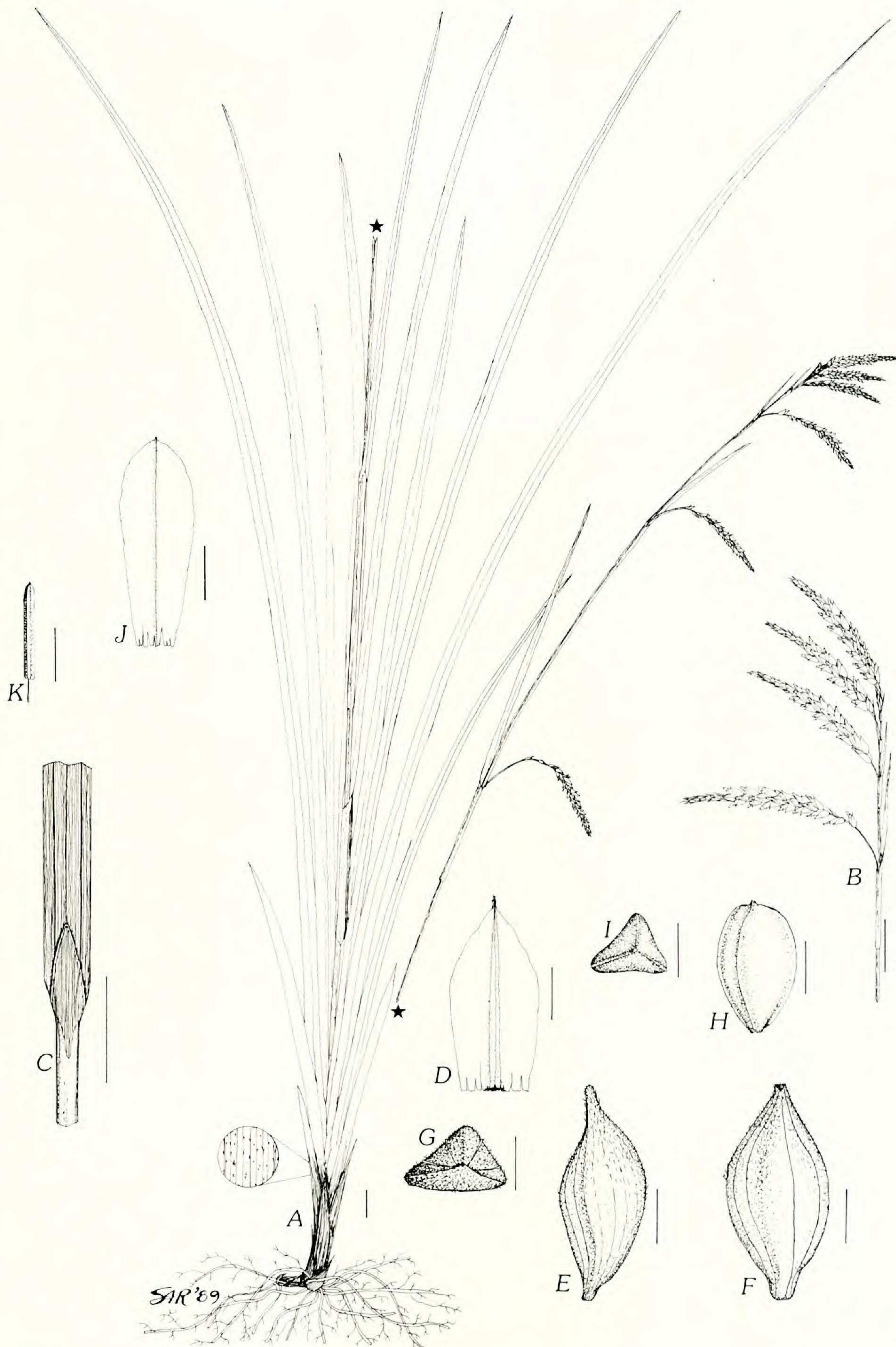


FIG. 1. *Carex caeligena*. A. Habit. B. Top portion of inflorescence. C. Sheath and ligule. D. Pistillate scale. E. Perigynium, side view. F. Perigynium, front view. G. Perigynium, top view. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Anther. Bar equals 1 cm in A–C and 1 mm in D–K. Drawn by Susan A. Reznicek from the type.

pubescent on distal $\frac{2}{3}$ of body, cuneately tapered to a short-stipitate base, 14–22-veined with 3–6 prominent and the rest faint, contracted into a beak; beaks 0.4–0.7 mm long, green, hispidulous, the apex oblique or irregularly bidentate, hyaline. Achenes 1.9–2.6 mm long, 1.2–1.6 mm wide, trigonous with more or less flat, obovate sides, tightly enveloped by the perigynium, pale brown, short-stipitate. Styles withering; stigmas 3. Anthers 3, 1.3–2.5 mm long.

PARATYPES: MEXICO. Tamaulipas: near Frank Harrison's "Rancho del Cielo" in Sierra de Guatemala above Gómez Farías, 4600 ft, 1 Sep 1952, *Sharp et al.* 52257 (MSC); Gómez Farías area, Rancho del Cielo, Indian Springs to Agua Linda turnoff, 26 Jun 1968, *Richardson* 393 (TEX); Mpio Gómez Farías, vicinity of Rancho del Cielo Biological Station, ca. 7 km WNW of Gómez Farías, NE of Indian Springs (Ojo de Agua de los Indios) towards Agua Linda, 1 Jun 1989, *Reznicek & Naczi* 8468 (MICH).

Carex caeligena is locally frequent in the vicinity of the Rancho del Cielo Biological Station of Texas Southmost College at about 1400–1500 m. It fruits in June and July and grows in oak-sweetgum-maple cloud forest and pine-oak forest. The epithet *caeligena*, "born of the heavens," refers to the type locality near Rancho del Cielo, "Ranch of the Heavens."

In addition to the several features noted in the key, *Carex caeligena* differs from *C. mackenziana* by its much longer ligules, (5–) 5.5–14 mm long as opposed to 0.8–3.5 mm long in *C. mackenziana*.

Carex pubigluma Reznicek, sp. nov. (fig. 2).—TYPE: MEXICO. Chiapas: Mpio. La Independencia, 6–10 km NNE of La Soledad along logging road from Las Margaritas to Campo Alegre, 1 Jul 1981, *Breedlove* 51289 (holotype: CAS!).

Plantae cespitosae; culmi 45–85 cm alti; vaginae basales purpurascens, glabrae. Folia 6–9 plerumque basalia; laminae 20–60 cm longae, 2.9–4.8 mm latae; vaginae 5–11 cm longae, stramineae, glabrae; ligulae 1.9–8.6 mm longae. Inflorescentiae 17–28 cm longae; spicae 5–6; spica terminalis staminata; spicae laterales androgynae, pendulae; bracteae infimae laminis 5.5–7 cm longis, 1.6–2.3 mm latis et vaginis 1.5–3.4 cm longis. Squamae pistillatae staminataeque pubescentes. Perigynia 3.6–4.6 mm longa, 1.3–1.6 mm lata, ascendens, trigona, viridia, pubescentes, in rostrum contracta; rostra 0.5–0.7 mm longa. Achenium ca. 2.6–3 mm longum, 1.2–1.4 mm latum. Styli marcescentes; stigmata 3. Antherae 3, 2.3–3.8 mm longae.

Plants cespitose, with thick, short rhizomes; roots greyish brown, not densely felted with root hairs; fertile culms 45–85 cm tall, trigonous, smooth, with glabrous, purple bladeless sheaths with stramineous veins. Leaves 6–9, mostly basal; blades 20–60 cm long, 2.9–4.8 mm wide, plicate, hispidulous on the adaxial surface above the ligule, otherwise glabrous, the margins and midrib antrorsely scabrous distally, the widest leaves ca. 3.5–4.8 mm wide; leaf sheaths 5–11 cm long, more or less tightly enveloping the culms, glabrous, stramineous or lightly purple-tinged on the midvein; inner band of sheaths finely pubescent near apex, stramineous and faintly red-dotted, faintly veined, the apex concave and finely ciliate; ligules 1.9–8.6 mm long, rounded to acute, usually reduced on upper leaves, the free portion ciliate. Vegetative shoots ca. 45–60 cm tall; leaves 4–6, similar to those of fertile culms; pseudoculms ca. 6–8.5 cm tall. Inflorescences 17–28 cm long, with the upper spikes overlapping and the lowest 2 spikes 7.5–14 cm distant; spikes single at nodes, pendulous on filiform, flexuous, smooth peduncles; lowermost spikes with peduncles 7–9 cm long, the uppermost lateral spikes with peduncles 0.8–1.1 cm long; lowermost

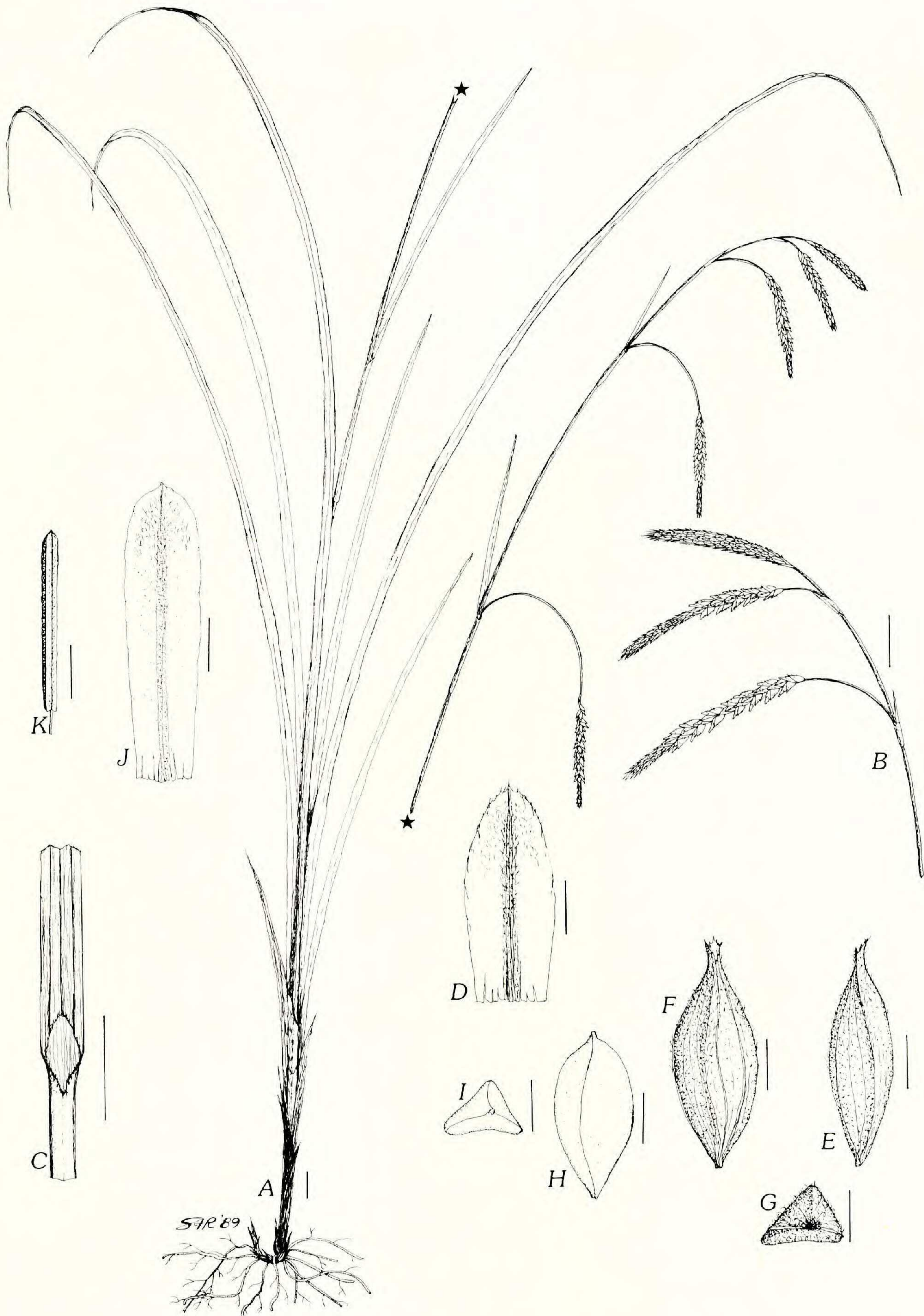


FIG. 2. *Carex pubigluma*. A. Habit. B. Top portion of inflorescence. C. Sheath and ligule. D. Pistillate scale. E. Perigynium, side view. F. Perigynium, front view. G. Perigynium, top view. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Anther. Bar equals 1 cm in A-C and 1 mm in D-K. Drawn by Susan A. Reznicek from the type.

bracts with blades 5.5–7 cm long and 1.6–2.3 cm wide and sheaths 1.5–3.4 cm long, the uppermost bracts much reduced. Spikes 5–6, the terminal staminate, the lateral androgynous. Terminal spikes 2.8–3.4 cm long, 1.9–2.7 mm wide, ca. 45–60-flowered; peduncles 4.5–13 mm long. Lateral spikes 1.9–5.3 cm long; staminate portion 0.5–1.4 cm long, ca. 4–30-flowered; pistillate portion 1.2–4.8 cm long, 3.8–5.8 mm wide, 8–30-flowered. Pistillate scales 3.6–5.8 mm long, 1.6–2 mm wide, obovate, obtuse to acute, pubescent distally on the abaxial surface and with the apex ciliate, stramineous with green center and hyaline margins, faintly reddish-brown dotted, 3–5-veined. Staminate scales 4.2–6.4 mm long, 1.4–1.8 mm wide, obovate, obtuse to acuminate, pubescent distally on the abaxial surface and with the apex ciliate, stramineous to castaneous with green center and hyaline margins, 1–3-veined. Perigynia 3.6–4.6 mm long, 1.3–1.6 mm wide, ascending and slightly outcurved when mature, trigonous with more or less flat, narrowly elliptic sides, green, pubescent on distal $\frac{2}{3}$ of body, more or less cuneately tapered to the base, ca. 14–18-veined with 2–5 prominent and the rest faint, tapered into a beak; beaks 0.5–0.7 mm long, green, hispidulous, the apex oblique, strongly flared, hyaline, ciliate. Achenes ca. 2.6–3 mm long, 1.2–1.4 mm wide, trigonous with more or less flat, obovate sides, tightly enveloped by the perigynium, pale brown, short-stipitate. Styles withering; stigmas 3. Anthers 3, 2.3–3.8 mm long.

Carex pubigluma is known only from Chiapas in pine-oak forest at 1600 m. Fruiting apparently occurs at least from late June through July. The epithet *pubigluma* refers to the pubescent pistillate and staminate scales, a convenient diagnostic feature of this species. This species is similar to *C. mackenziana*, but in addition to the differences noted in the key, is a much laxer, more slender plant with longer, narrower leaves.

Carex novogaliciana Reznicek, sp. nov. (fig. 3).—TYPE: MEXICO. Jalisco: Mpio. Puerto Vallarta, entre El Arroyo Verde y El Nogal, 7 Nov 1971, *González 579* (holotype: MICH!).

Plantae cespitosae; culmi ca. 65 cm alti; vaginae basales brunneae, glabrae. Folia 12, plerumque basalia; laminae 30–55 cm longae, 11–16 mm latae; vaginae 4.5–9 cm longae, glabrae; ligulae ca. 7–14 mm longae. Inflorescentiae: ca. 26 cm longae; paniculae 6, paniculae terminales lateralesque simillimae, erectiusculae, 2.9–4.6 cm longae; bracteae infimae laminis ca. 40 cm longis, ca. 10 mm latis et vaginis ca. 2.5 cm longis. Perigynia 3.1–3.6 mm longa, 1.2–1.5 mm lata, patentia, extrorsus curvata, trigona, straminia et rubroguttata, glabra, in rostrum contracta; rostra 0.9–1.4 mm longa. Achenium ca. 1.8–2.2 mm longum, ca. 1.1–1.4 mm latum. Styli marcescentes; stigmata 3. Antherae 3, ca. 1.5–2 mm longae.

Plants cespitose, with short, thick rhizomes; roots pale brown, not densely felted with root hairs; fertile culms ca. 65 cm tall, trigonous, smooth, with glabrous, dark brown basal sheaths. Leaves ca. 12, mostly basal; blades 30–55 cm long, 11–16 mm wide, plicate, glabrous, antrorsely scabrous on the margins and sometimes the main veins distally; leaf sheaths 4.5–9 cm long, loosely enveloping culm, glabrous, green; inner band of sheaths glabrous, hyaline, becoming stramineous near apex, finely veined, the apex concave; ligules ca. 7–14 mm long, obtuse to acute, the free portion prominent, stramineous. Vegetative shoots unknown. Inflorescences ca. 26 cm long, with the upper panicles overlapping and the lowest 2 panicles ca. 8 cm distant, panicles single at nodes, ascending to erect on stiff, scabrous peduncles; lowest spike with peduncle ca. 8.5 cm long, the uppermost lateral panicles essentially sessile;

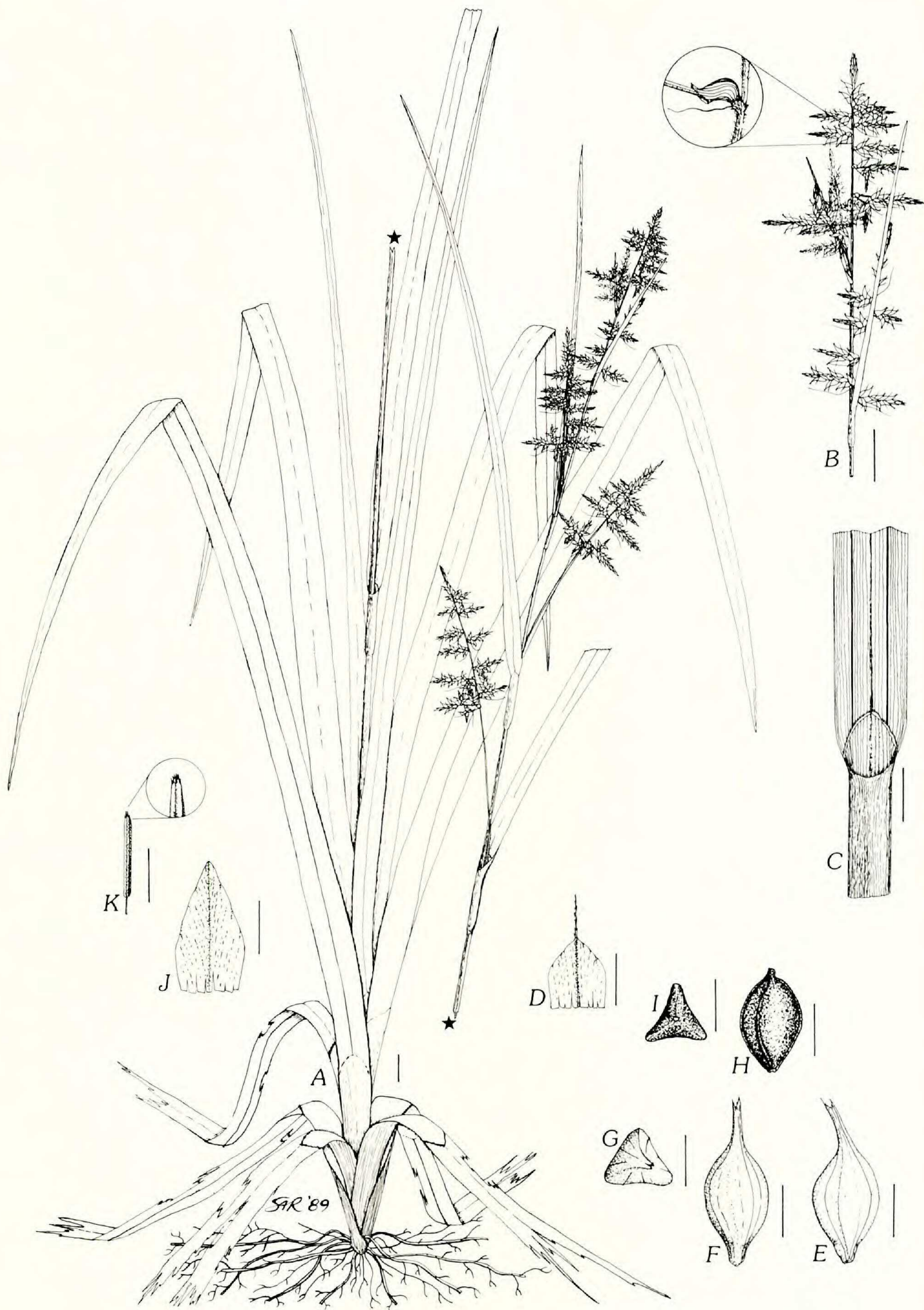


FIG. 3. *Carex novogaliciana*. A. Habit. B. Top portion of inflorescence. C. Sheath and ligule. D. Pistillate scale. E. Perigynium, side view. F. Perigynium, front view. G. Perigynium, top view. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Anther. Bar equals 1 cm in A–C and 1 mm in D–K. Drawn by Susan A. Reznicek from the type.

lowermost bract with blade ca. 40 cm long (broken before tip) and ca. 10 mm wide and sheath ca. 2.5 cm long, the uppermost bracts much reduced, the terminal panicle bractless and with a peduncle ca. 2 cm long. Panicles 6, pyramidal, 2.9–4.6 cm long, ca. 2–3.5 cm wide, with 7–12 primary androgynous branches, the lower 1–3 branches again often compound with 1–3 secondary branches 4–10 mm long; primary branches 6–19 mm long, with an urceolate, pubescent cladoprophyll; pistillate portion 3.5–15 mm long, ca. 5–6 mm wide (excluding secondary branches), with 5–15 perigynia (and up to 3 secondary branches); staminate portion 2.5–8 mm long, 0.8–1.2 mm wide, 3–9-flowered. Pistillate scales 1.4–3.5 mm long, 0.8–1.5 mm wide, ovate, acute to acuminate, usually with a scabrous awn up to 2.5 mm long, pubescent abaxially, stramineous with a green center and hyaline margins, heavily reddish purple streaked and dotted, 1-veined. Staminate scales 2.2–3.6 mm long, ca. 1–1.5 mm wide, ovate to narrowly ovate, acute to acuminate, pubescent abaxially, reddish brown with hyaline margins, 1–3-veined. Perigynia 3.1–3.6 mm long, 1.2–1.5 mm wide, spreading and outcurved, trigonous with flat to slightly concave, ovate to broadly elliptic sides, stramineous and finely red-dotted, glabrous or sparsely scabrous, short-stipitate, ca. 7–12-veined with 2–6 veins prominent and the rest faint, contracted into a beak; beaks 0.9–1.4 mm long, stramineous and red-dotted, scabrous, the apex obscurely and irregularly bidentulate with teeth up to 0.5 mm long. Achenes ca. 1.8–2.2 mm long, ca. 1.1–1.4 mm wide, trigonous with concave, elliptic sides, tightly enveloped by the perigynia, dark brown, sessile. Styles withering; stigmas 3. Anthers 3, ca. 1.5–2 mm long.

The only known collection of *Carex novogaliciana* came from a ravine in the municipality of Puerto Vallarta at an elevation of 850 m; the collector noted that the plant was very rare. The species probably fruits in September or early October. It is named for its occurrence in Nueva Galicia.

The holotype had shed most of its perigynia and preparing the drawing (fig. 3) involved significant reconstruction. Ranges of perigynium and achene measurements especially are thus tentative. Additional collections of this species are much needed.

Carex novogaliciana belongs, along with most members of subgenus *Indocarex* in the Neotropics, in the catchall section *Indicae* Kük., as recognized by Hermann (1974). It has perigynia ca. 3.1–3.6 mm long, achenes ca. 1.8–2.2 mm long, and pale, awned pistillate scales 1.4–3.5 mm long and is thus most similar in reproductive characters to *C. polystachya* Sw. From this extremely variable and abundant species, *C. novogaliciana* differs most strikingly in having leaves up to 16 mm wide and pubescent pistillate and staminate scales. As well, the staminate scales of *C. novogaliciana* are merely acute or acuminate, and the primary panicle branches are up to 19 mm long and loosely flowered. *Carex polystachya* has leaves usually less than 5 mm wide, glabrous pistillate and staminate scales, at least some staminate scales usually short-awned, and shorter and more densely flowered primary panicle branches. Some variants of *C. polystachya*, notably tall plants from San José Province, Costa Rica, Chiapas, Mexico, and Andean South America have leaves up to 8–10 mm wide, but these, too, have glabrous pistillate and staminate scales, at least some staminate scales short-awned, and shorter, more densely flowered primary panicle branches. When the protean *C. polystachya* is better understood, it will probably be found to consist of several closely related species. In any event, a thorough systematic study of this species is much needed.

Carex fructus Reznicek, sp. nov. (fig. 4).—TYPE: MEXICO. Tamaulipas: Mpio. Gómez Farías, vicinity of Rancho del Cielo Biological Station, ca. 7 km WNW of

Gómez Farías, NE of Indian Springs (Ojo de Agua de los Indios) towards Agua Linda, 1 Jun 1989, *Reznicek & Naczi 8467* (holotype: MICH!; isotypes: CAS! CHAPA! DUKE! F! MEXU! MO! NY! TEX! WIS!).

Plantae cespitosae; culmi (11-) 20-75 cm alti; vaginae basales purpurascens, glabrae. Folia 2-10, plerumque basalia; laminae 10-55 cm longae, 2.4-5.6 mm latae; vaginae 3.5-14 cm longae; ligulae truncatae vel acutae ad 4.2 mm longae. Inflorescentiae (2-) 6.5-37 cm longae; spicae 2-7, erectae, supernae 1-3 staminatae, ceterae androgynae vel pistillatae; bracteae infimae laminis 5.3-23 cm longis, 1.3-2.3 mm latis et vaginis (0.8-) 1.1-7.5 cm longis. Perigynia 2.8-4 mm longa, 0.9-1.3 mm lata, patentia, extrorsus curvata, trigona, straminia et dilute rubroguttata, glabra, in rostrum contracta; rostra 1-1.5 mm longa. Achenium 1.5-2.1 mm longum, 0.8-1.2 mm latum. Styli marcescentes; stigmata 3. Antherae 3, 1.7-2.4 mm longae.

Plants cespitose, with short rhizomes; roots pale brown, not densely felted with root hairs; fertile culms (11-) 20-75 cm tall, trigonous, smooth, with glabrous, dark red to deep purple-red bladeless basal sheaths with stramineous veins. Leaves 2-5 (-10 if flowering centrally), mostly basal; blades 10-55 cm long, 2.4-5.6 mm wide, plicate, glabrous, the margins antrorsely scabrous, the widest leaves 3.6-5.6 mm wide; leaf sheaths 3.5-14 cm long, more or less tightly enveloping culms, glabrous, strongly purple-tinged near base; inner band of sheath glabrous, white, often purple-dotted or purple-tinged or both, the apex prolonged into a tongue-shaped contraligule or lingula up to 1.8 mm long at least on the larger leaves, but sometimes truncate or even slightly concave, especially on upper culm leaves; ligules usually truncate or even slightly concave, rarely acute and up to 4.2 mm long on the uppermost leaves, the free portion entire. Vegetative shoots 15-45 cm tall; leaves 3-7, similar to those of fertile culms; pseudoculms 4-13 cm tall. Inflorescences (2-) 6.5-37 cm long, with the upper 2-5 spikes strongly crowded and overlapping and the lowest 2 lateral spikes (2-) 5-22 cm distant; spikes single at nodes, erect or ascending on filiform, smooth or slightly scabrous peduncles; lowermost spikes with peduncles (0.8-) 1.3-14.5 cm long, the uppermost lateral spikes sessile or with peduncles 0.1-0.8 cm long; lowermost bracts with blades (4-) 7-23 cm long and 1.3-3.3 mm wide and sheaths (0.8-) 1.1-7.5 cm long, the uppermost bracts much reduced. Spikes 2-7, the terminal staminate, the lateral androgynous, pistillate, or often the upper 1-2 wholly staminate. Terminal spikes (0.5-) 1.3-3.8 cm long, 1.3-3.4 mm wide, 15-90-flowered, peduncles 2-14 mm long. Lateral staminate spikes 6-19 mm long, 15-70-flowered, sessile or nearly so; lateral androgynous or pistillate spikes 0.8-3.6 cm long; occasionally compound with 1-2 basal secondary spikes up to 8.5 mm long; staminate portion (0-) 0.3-1 cm long, (0-) 2-35-flowered; pistillate portion (0.4-) 0.8-3.3 cm long, 5.5-7.7 mm wide, (5-) 12-85-flowered. Pistillate scales 1.7-3.8 mm long, 1.1-1.6 mm wide, ovate to oblong, mostly emarginate, sometimes obtuse to acuminate, usually with a scabrous awn 0.2-2.1 mm long, glabrous, hyaline to stramineous with a green center, often reddish purple-tinged or -streaked distally, 1-3 veined. Staminate scales 2.5-4.2 mm long, 1.4-2.4 mm wide, ovate to narrowly oblong, mostly emarginate, sometimes acute to acuminate, usually with a scabrous awn up to 0.8 mm long, glabrous, stramineous to reddish purple with a green center and hyaline margins, 3-veined. Perigynia 2.8-4 mm long, 0.9-1.3 mm wide, spreading, strongly outcurved, trigonous with convex, ovate sides, stramineous to pale brown, faintly red-dotted when fully mature, sessile, 10-15-veined with 2 prominent and the rest faint, tapering into a beak; beaks 1-1.5 mm long, glabrous, the apex bidentulate with thin,

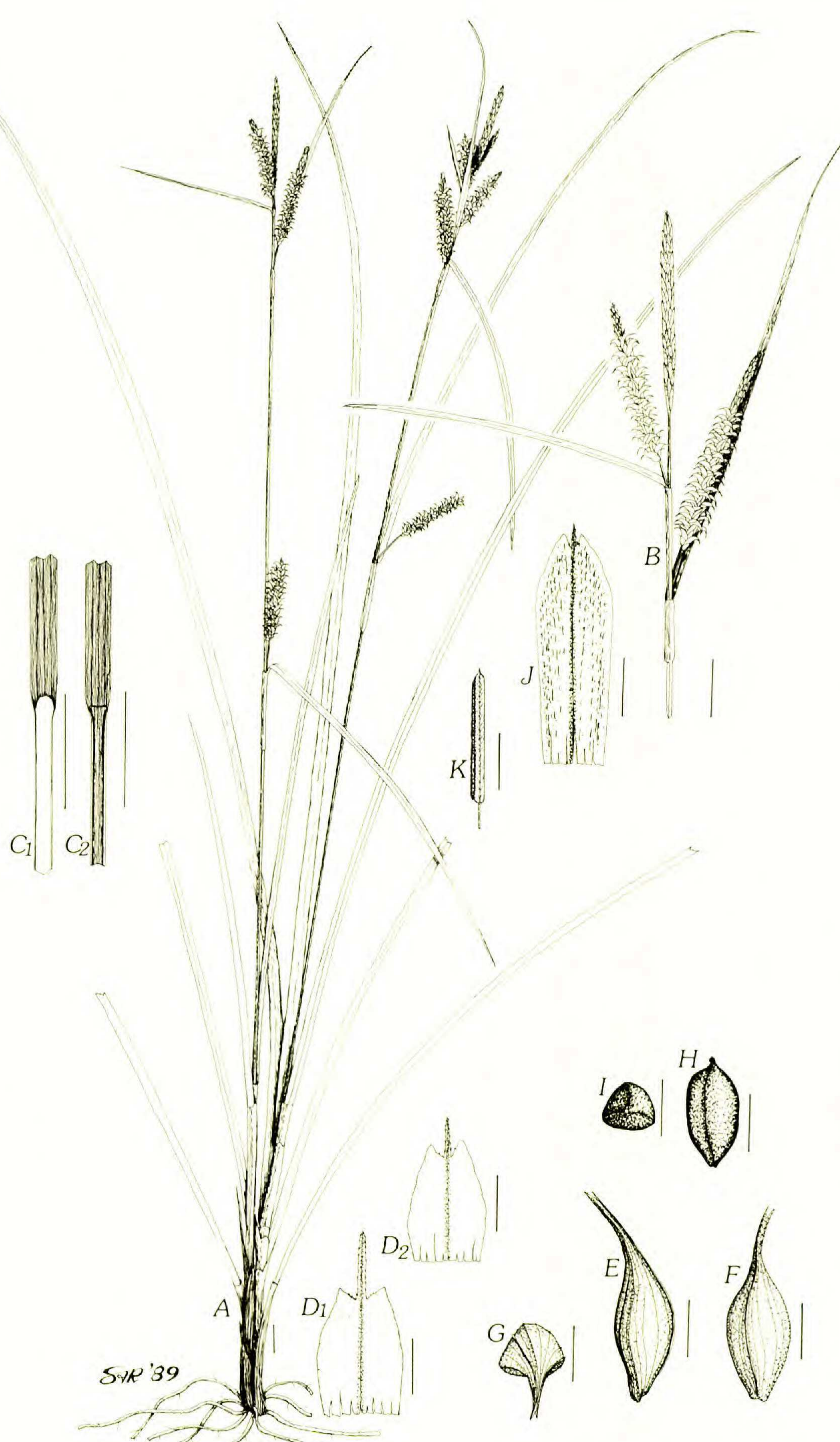


FIG. 4. *Carex fructus*. A. Habit. B. Top portion of inflorescence. C. Sheath and ligule: C₁, inner band; C₂, ligule with inner band of sheath cut away. D. Pistillate scales: D₁, scale from near base of spike; D₂, scale from near apex of spike. E. Perigynium, side view. F. Perigynium, front view. G. Perigynium, top view. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Anther. Bar equals 1 cm in A-C and 1 mm in D-K. Drawn by Susan A. Reznicek from the type.

firm teeth 0.2–0.6 mm long. Achenes 1.5–2.1 mm long, 0.8–1.2 mm wide, trigonous with convex, obovate to oblong sides, pale brown, sessile. Styles withering; stigmas 3. Anthers 3, 1.7–2.4 mm long.

Carex fructus was found along the margins of a moist, open swale dominated by *Paspalum* and *Eleocharis* in pine forest at 1500 m. A few, sometimes depauperate, plants occurred on moist logging roads in the vicinity. Fruiting evidently occurs throughout May and into early June. After finding and studying the specific plants we were after, Rob Naczi and I did not go back to our base, but rather explored the region further. The fruits of our labor included the discovery of this wholly unexpected species just before turning back, hence the epithet *fructus*.

Carex fructus is clearly a relative of *C. distentiformis* F. J. Herm. (Hermann 1971, 1974), known from two collections in Chiapas. Both species have cylindrical spikes of spreading, outcurved perigynia; the perigynia are rather similar both in shape and in size. The inflorescences are similar, with several spikes clustered together at the apex of the culm and one or two distant. Both have the larger, lower leaves with the ligule truncate or even concave and the inner band prolonged into a lingula or contraligule. However, *C. fructus* is a shorter and much more slender plant differing from *C. distentiformis* in many characters. The perigynia and pistillate scales are pale brown and at most faintly and finely red-dotted in *C. fructus*, whereas those of *C. distentiformis* are dark brown and densely red-dotted. The lowermost spikes of *C. fructus* are only occasionally compound and are exerted well beyond their sheaths (exposed portion of peduncles 0.9–6.5 cm long), whereas the lowermost spikes of *C. distentiformis* are usually compound and not exerted beyond their sheaths. The widest leaves of *C. fructus* are up to 5.6 mm wide, whereas those of *C. distentiformis* are up to 11 mm wide [statements in Hermann (1971, 1974) that the leaves are up to 5.5 mm wide notwithstanding]. The basal sheaths of *C. fructus* are dark reddish purple, whereas those of *C. distentiformis* are cinnamon-brown or faintly reddish tinged. Both the staminate and pistillate scales of *C. fructus* are usually emarginate and awned, whereas those of *C. distentiformis* are acute to acuminate-awned.

Hermann (1971) placed *C. distentiformis* in sect. *Spirostachyae* (Drejer) L. Bailey [sub sect. *Extensae* (Fries) Mackenzie], and *C. fructus* should presumably be in the same section. However, both species are anomalous in that section by their spreading, outcurved perigynia that give the spikes a squarrose appearance (Crins & Ball 1988), and perhaps warrant their own section. Neither species is close to *C. fuscula* Urv. (*C. distenda* Kunze), to which Hermann (1971) compared his *C. distentiformis*. *Carex fuscula* is a smaller plant without spreading, excurved perigynia. Some species in sections *Vesicariae* (O. Lang) Christ or *Pseudocypereae* (L. Bailey) Christ might seem similar to *C. fructus* or *C. distentiformis* because of their spreading, outcurved perigynia in cylindrical spikes, but differ in their persistent, bony styles, septate-nodulose leaves and sheaths, and perigynia that do not closely envelope the achenes.

Many perigynia of this collection are infected by the fungus *Cladosporium*, but this does not appear to distort their morphology.

NEW RECORDS

Carex nigromarginata Schwein.

This widespread eastern North American species can be added to the Mexican

flora on the basis of the collection cited below. It can be distinguished from all other Mexican species of sect. *Acrocystis* Dumort. [*Montanae* (Kunth) J. Carey] by the key in Mackenzie (1935).

MEXICO. Puebla: Sn. Juan Tecuanipa, 14 Aug 1966, *Boege 237* (MEXU).

Carex meadii Dewey.

A widespread species primarily of the Great Plains, *C. meadii* has long been reported from Arizona (Hermann 1970), and its occurrence in northern Mexico is not surprising. The only other species of sect. *Paniccae* G. Don in Mexico is the recently reported dwarf, high alpine *C. brachycalama* Griseb. (González 1983), from which *C. meadii* differs in its elongate culms and much larger size.

MEXICO. Chihuahua: Sierra Madre near Colonia García, 7 Jun 1899, *Townsend & Barber 19* (NY). [Mixed sheet with *C. chihuahuensis* Mackenzie].

Carex vulpinoidea Michaux.

An extremely abundant plant throughout much of the United States and Canada, this species is known from the West Indies [República Dominicana: La Vega, *Zanoni et al. 20143* (NY)] and now from Mexico, based on the collection cited below. The only other species of sect. *Multiflorae* (Kunth) Mackenzie occurring in Mexico are *C. agrostoides* Mackenzie and *C. alma* L. Bailey, and the key in Hermann (1970) effectively separates these three.

MEXICO. Oaxaca: Sierra de Zempoaltepetl, 1.4 km SW of Sn. Pedro y Sn. Pablo Ayutla, on road from Mitla into the Sierra Villa Alta, ca. 68 km W of Oaxaca, 23 Feb 1988, *Reznicek & Reznicek 8110* (MICH).

Carex leptopoda Mackenzie.

A wide ranging Rocky Mountain species known from Arizona, but somewhat disjunct to northern Mexico. Often treated as only a variety or subspecies of *C. deweyana* Schwein. The key in Hermann (1970) separates all the American species in the *C. deweyana* group. Besides members of the *C. deweyana* group, the only other species of sect. *Deweyanae* Mackenzie in Mexico is the distinctive *C. bromoides* Willd., which differs from the *C. deweyana* group on having narrower perigynia and more numerous veins on both surfaces of the perigynia.

MEXICO. Chihuahua: Mpio. Ocampo, Parque Nacional de la Cascada de Basaseachic, 1800 m, 26 Apr 1986, *Spellenberg et al. 8458* (MICH).

Carex standleyana Steyerm.

Endemic to Mesoamerica, this species is reported from Honduras and Guatemala by Hermann (1974) and is likely more widespread. The Chiapas collection cited below appears to be the first from Mexico.

MEXICO. Chiapas: Mpio. of Angel Albino Corzo, above Finca Cuxtepec, 1380 m, 11 Aug 1981 (CAS).

NOTES ON POORLY KNOWN SPECIES

Carex mcvaughii Reznicek.

The type collection of this species was slightly immature and the excellent,

mature collections cited below now allow for a more precise description of the perigynia and achenes, as well as an accurate sectional placement. Mature perigynia are significantly larger than the measurements in Reznicek (1982): 3.1–4 mm long and 1.4–2 mm wide, with beaks 0.8–1.2 mm long and beak teeth 0.3–0.6 mm long. The most surprising difference is that mature perigynia are strongly inflated, with broadly ellipsoid to nearly spherical bodies. Mature achenes are 1.4–1.6 mm long, 0.8–1.2 mm wide, trigonous with convex, oblong or obovate sides, pale brown, and strongly papillose. Perigynia and achenes are illustrated in fig. 5, which may be used to supplement the illustration in Reznicek (1982).

The tentative sectional alignment of *Carex mcvaughii* in Reznicek (1982) was quite incorrect. Mature material shows clearly the persistent styles, which, combined with the many-veined perigynia, awned pistillate and staminate scales, and septate-nodulose leaves and sheaths, place *C. mcvaughii* in sect. *Pseudo-cypereae*. However, the strongly inflated and bladdery perigynia are quite anomalous in sect. *Pseudo-cypereae* and call into question the distinctness of this section from sect. *Vesicariae*. The papillose achenes and the large bodies of the ciliate pistillate scales of *C. mcvaughii* align it with *C. thurberi* Dewey, which appears to be its closest relative. *Carex thurberi* is a much larger and coarser plant with longer, but at most slightly inflated perigynia. The following couplet should effectively separate them.

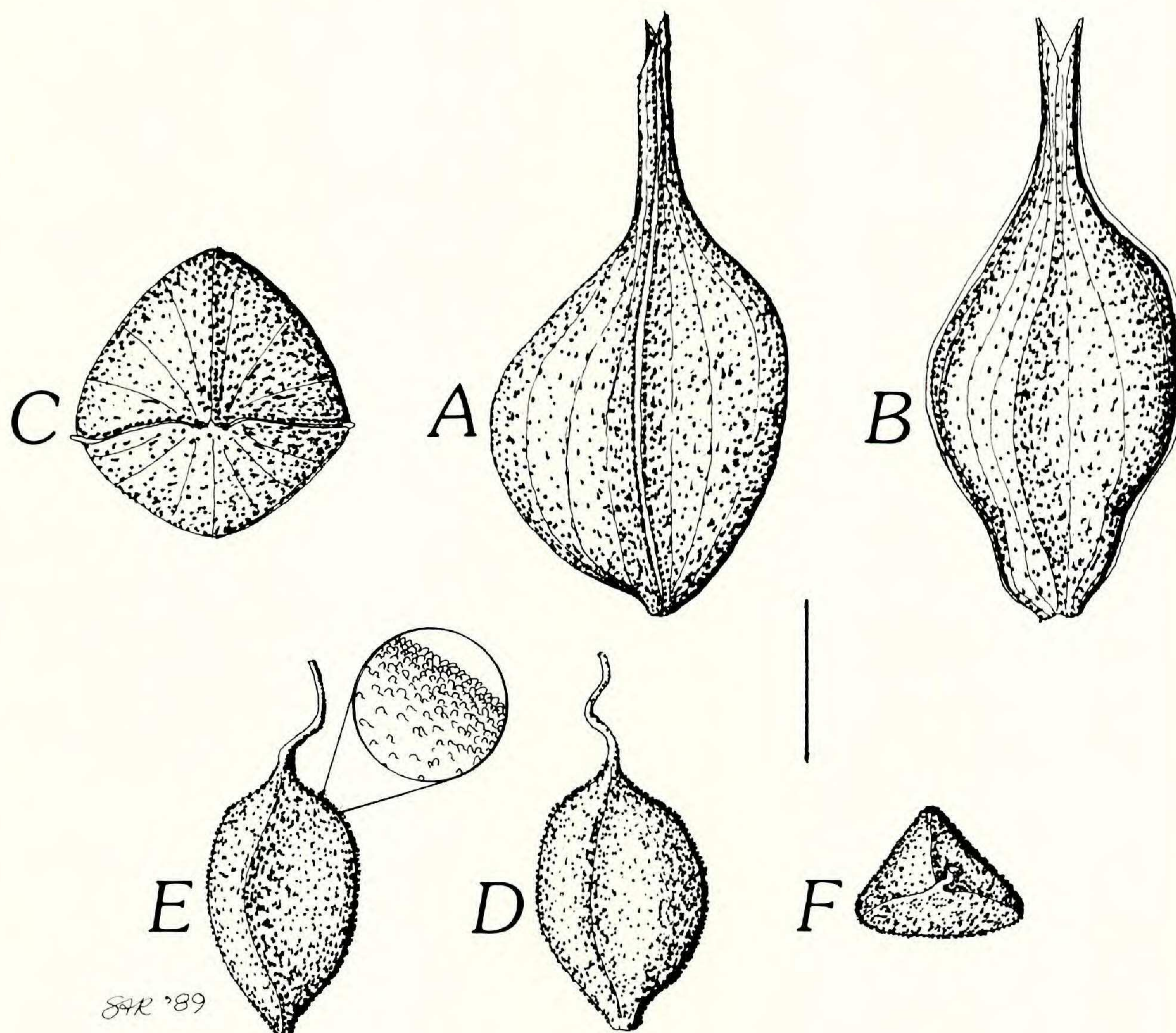


FIG. 5. *Carex mcvaughii*. A. Perigynium, side view. B. Perigynium, front view. C. Perigynium, top view. D. Achene, front view. E. Achene, side view. F. Achene, top view. Bar equals 1 mm. Drawn by Susan A. Reznicek from *Fuentes 124* (MICH).

Widest leaves 5.5–9 mm wide, perigynia not strongly inflated, the bodies narrowly ovoid, 0.9–1.5 (–1.8) mm wide. *C. thurberi*.

Widest leaves 3.3–4.5 mm wide, perigynia strongly inflated and bladderly, the bodies broadly ellipsoid to nearly spherical, 1.4–2 mm wide. *C. mcvaughii*.

MEXICO. Jalisco: Mpio. Tecalitlán, 48 km al S de Cd. Guzmán, 1950 m, 24 May 1988, *Fuentes 124* (MICH); Tuxcacuesco, 16–17 km al SSW de Tuxcacuesco, 3 km al W de la Canita, 19°38'27" N, 104°09'36" W, 1700 m, 6 Jun 1988, *Santana 3244* (ZEA).

Carex hultenii Aspl.

This beautiful, large, broad-leaved species was described from a single over-mature and somewhat smut-infected specimen collected in 1932 at the Great Falls of the River Necaxa in the Huauchinango region, Puebla, *Fröderstrom & Hultén 757* (S, photo MICH). The falls is now dammed and the species was thought to be extinct. It was, however, collected at one site in Chiapas in 1980 and 1981, as cited below. Not mentioned in any descriptions, due to the poor quality of the holotype, are the creamy-white, fleshy, more or less inflated perigynia unique among Neotropical *Carex*.

MEXICO. Chiapas: Mpio. of Ocosingo, 70 km SW of Palenque on road to Ocosingo along the Jol Uk'um, 550 m, 7 Nov 1980, *Breedlove 47165* (CAS); 4 Dec 1980, *48280* (CAS); 7 Nov 1981, *55252* (CAS).

Carex purdiei Boott.

This species was tentatively reported for Mexico by Hermann (1974) from Iztaccíhuatl based on an immature collection. This specimen [Mexico: México, Iztaccíhuatl, Cañada de Alcalicán, *Beaman 3531*, (MSC)], is a young plant of *C. echinata* Murray subsp. *townsendii* (Mackenzie) Reznicek, a species well known from the region (Reznicek 1987), and *C. purdiei* must be deleted from the Mexican flora.

SUMMARY

Hermann (1974) reported 86 species of *Carex* from Mexico, including six species in the addenda on pgs. 208–209. Publications since then (table 1) have added an additional nine species. This paper also adds nine species. However, Reznicek (1986) reduced *C. viridiflora* Mackenzie to synonymy under *C. perlonga* Fern., and *C. angustior* Mackenzie was eliminated by Reznicek (1987). With *C. purdiei* now

TABLE 1. Published additions to the *Carex* flora of Mexico since Hermann (1974).

Species	Citation
<i>Carex douglasii</i> Boott	Wiggins (1980)
<i>Carex hermannii</i> Cochr.	Cochrane (1981a)
<i>Carex deweyana</i> Schwein.	Cochrane (1981b)
<i>Carex austromexicana</i> Reznicek	Reznicek (1982)
<i>Carex mcvaughii</i> Reznicek	Reznicek (1982)
<i>Carex brachycalama</i> Griseb.	González (1983)
<i>Carex brunnipes</i> Reznicek	Reznicek (1986)
<i>Carex flexirostris</i> Reznicek	Reznicek (1986)
<i>Carex ixtapalucensis</i> Reznicek	Reznicek (1986)

also deleted from the Mexican flora, there are 101 species of *Carex* now known from Mexico—a number that will surely still increase substantially in the future.

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